

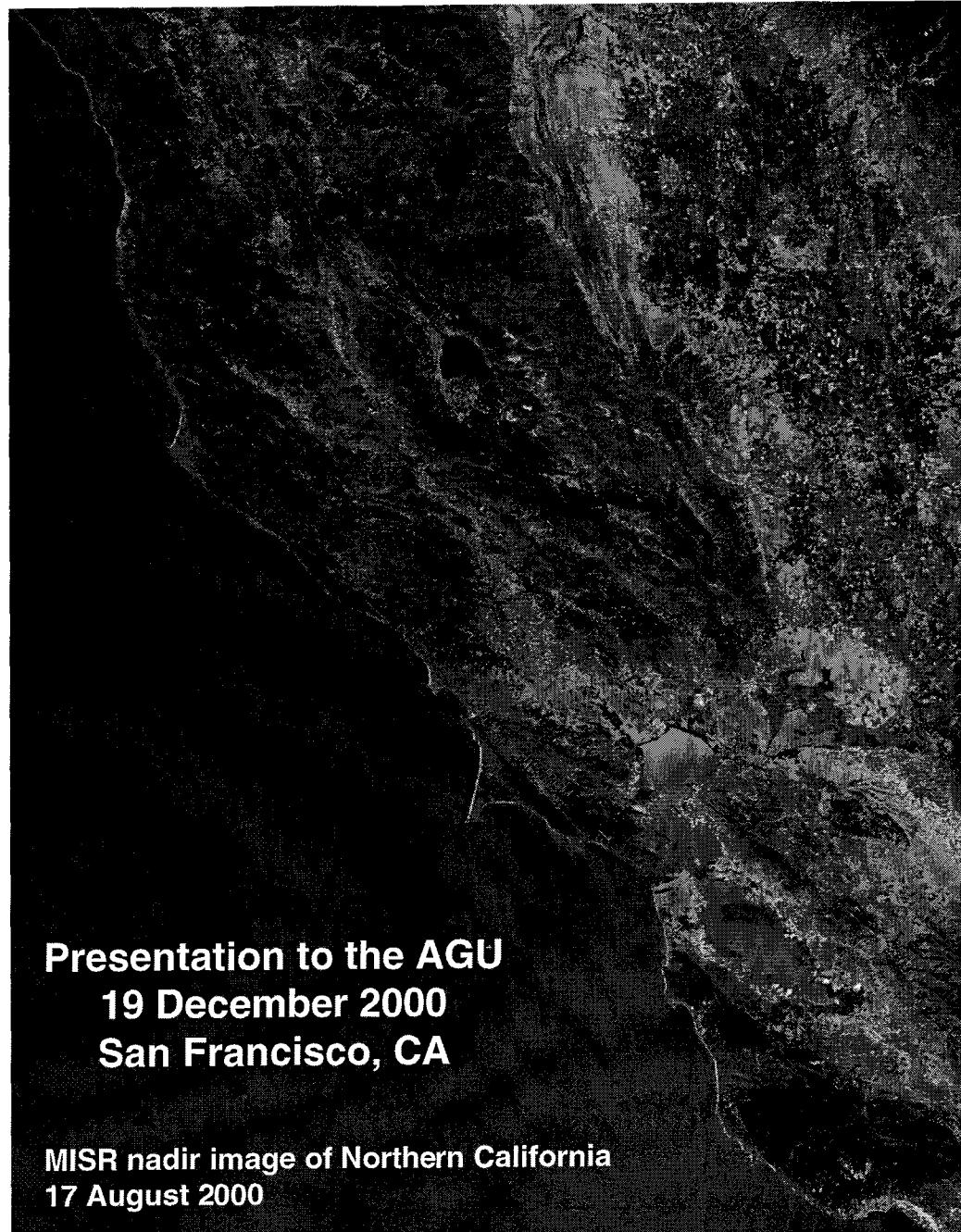
Aerosol Observations with the Terra Multi-angle Imaging SpectroRadiometer



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Kathleen A. Crean**

**Presentation to the AGU
19 December 2000
San Francisco, CA**

MISR nadir image of Northern California
17 August 2000



ACKNOWLEDGMENTS

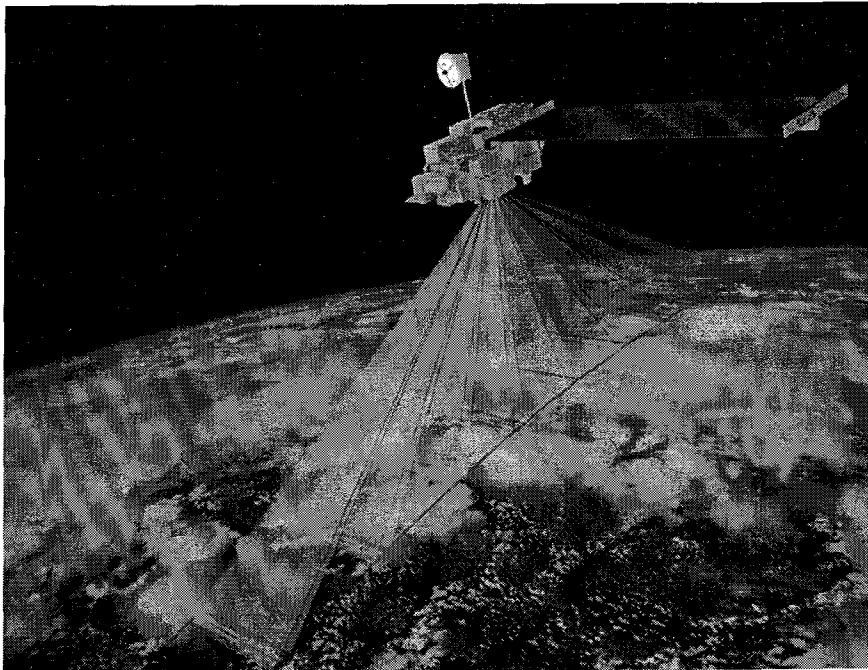
Wedad Abdou, Jim Conel, Stu Pilorz: Data analysis

Robert Ando: MISR Level 2 data processing

Mike Bull, Ruth Monarrez: MISR software engineering

Barbara Gaitley: Sunphotometer processing, graphics

Brent Holben, Mark Helmlinger: Aeronet data



MISR characteristics:

9 view angles from 70.5° forward of vertical to 70.5° aftward

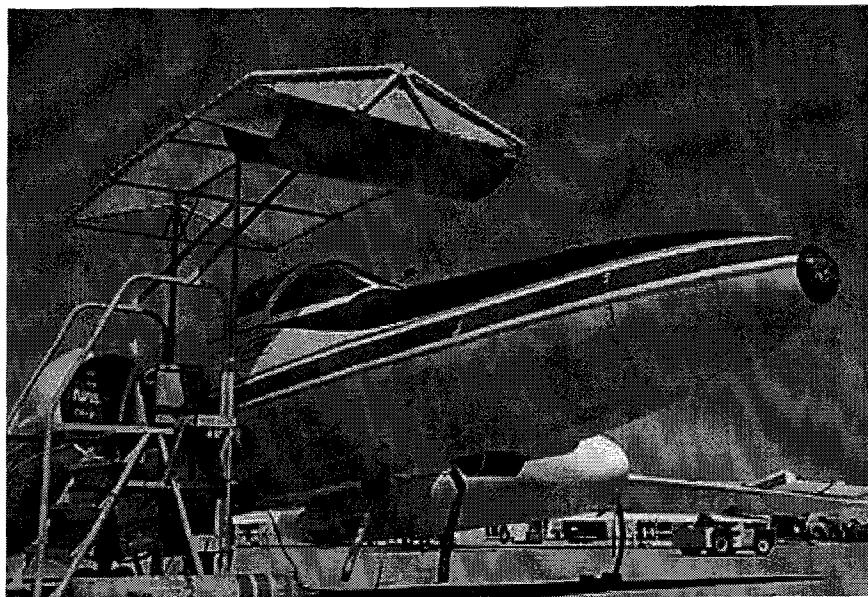
**4 spectral bands at each angle:
446, 558, 672, 866 nm**

**400 km swath
275-m to 1.1-km resolution
9-day global coverage**

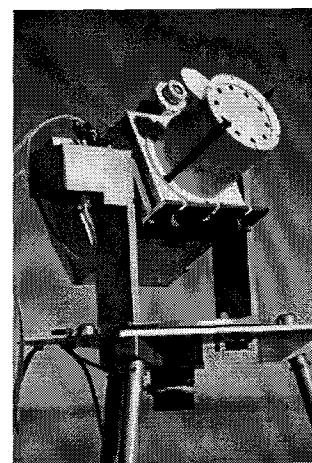
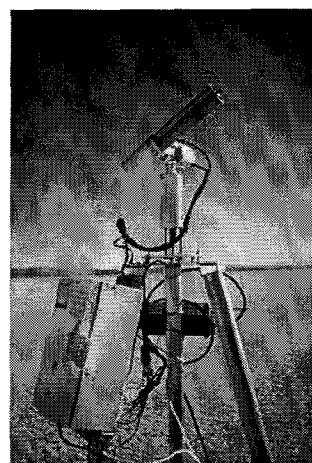
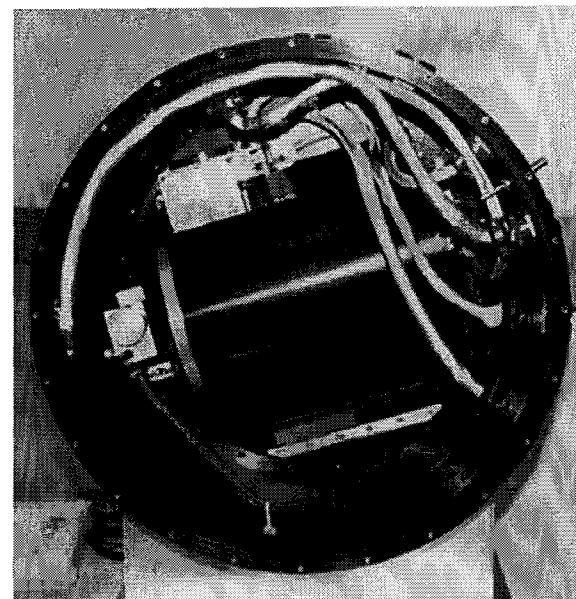
**7 minutes to observe each scene
at all 9 angles**



On-board calibration system

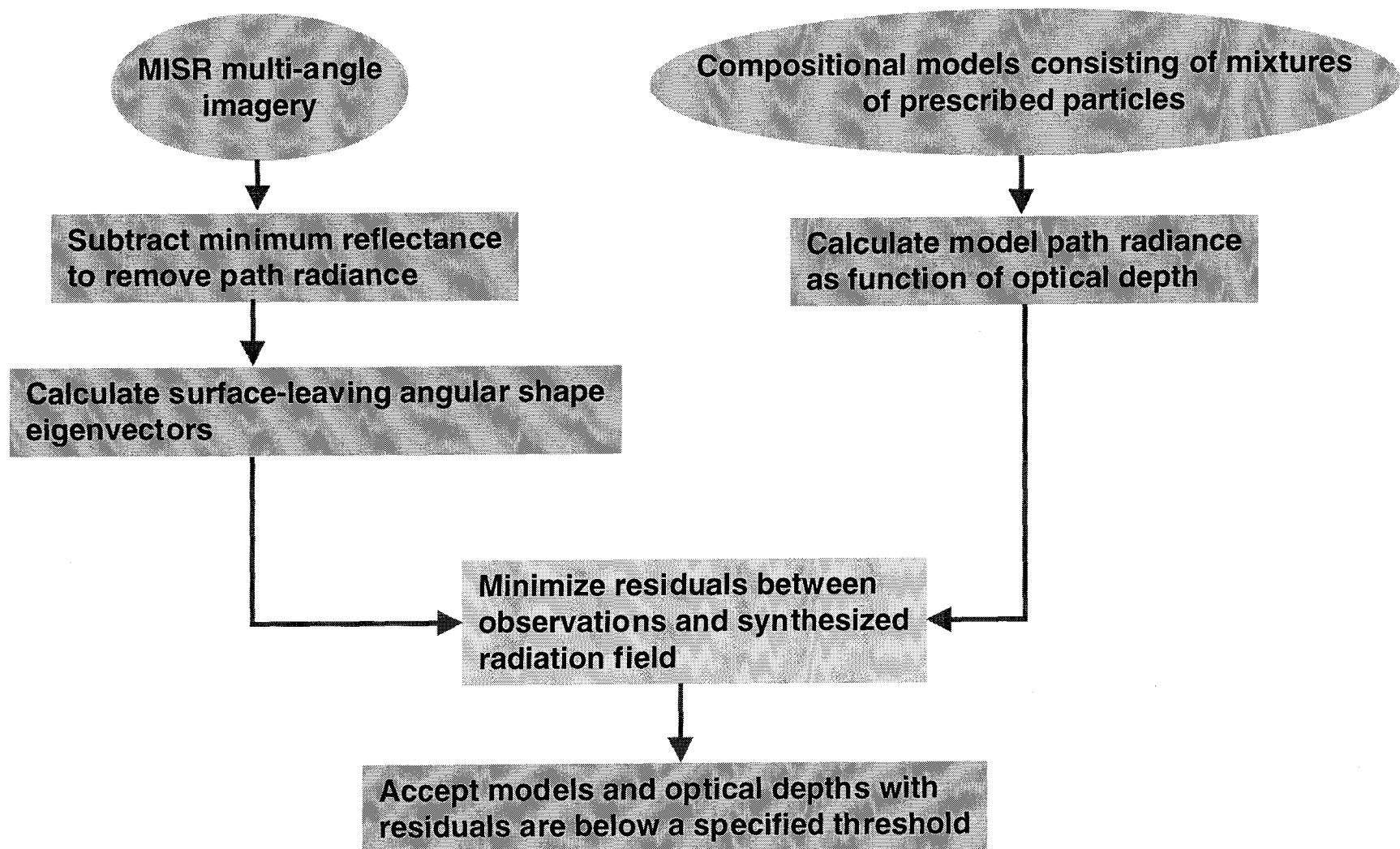


AirMISR

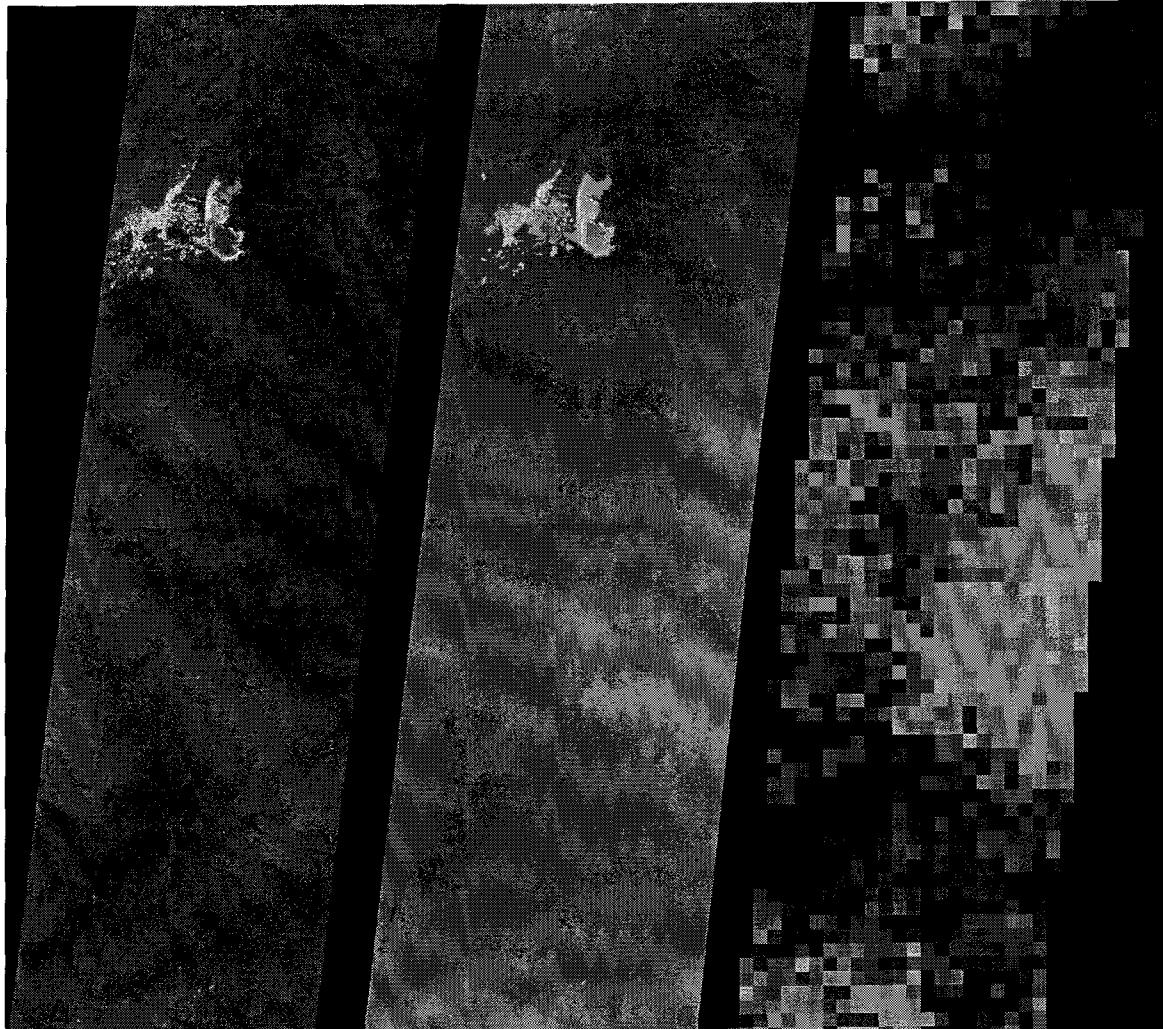


CIMEL Reagan
sunphotometer sunphotometer

AEROSOL RETRIEVAL METHODOLOGY OVER LAND



FEATURES OF THE ALGORITHM



nadir image

70° image

retrieved optical depths

Uses surface contrasts
and angular shapes
to isolate land-leaving
and atmospheric path
radiances

Uses 16x16 arrays of
1.1-km pixels-- retrievals
performed in 17.6-km
regions

New approach with
no flight heritage

CURRENT MODELS USED IN THE AEROSOL RETRIEVALS

<u>MODEL</u>	<u>ω_0 (558 nm)</u>
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95% sulfate 5% black carbon	0.96
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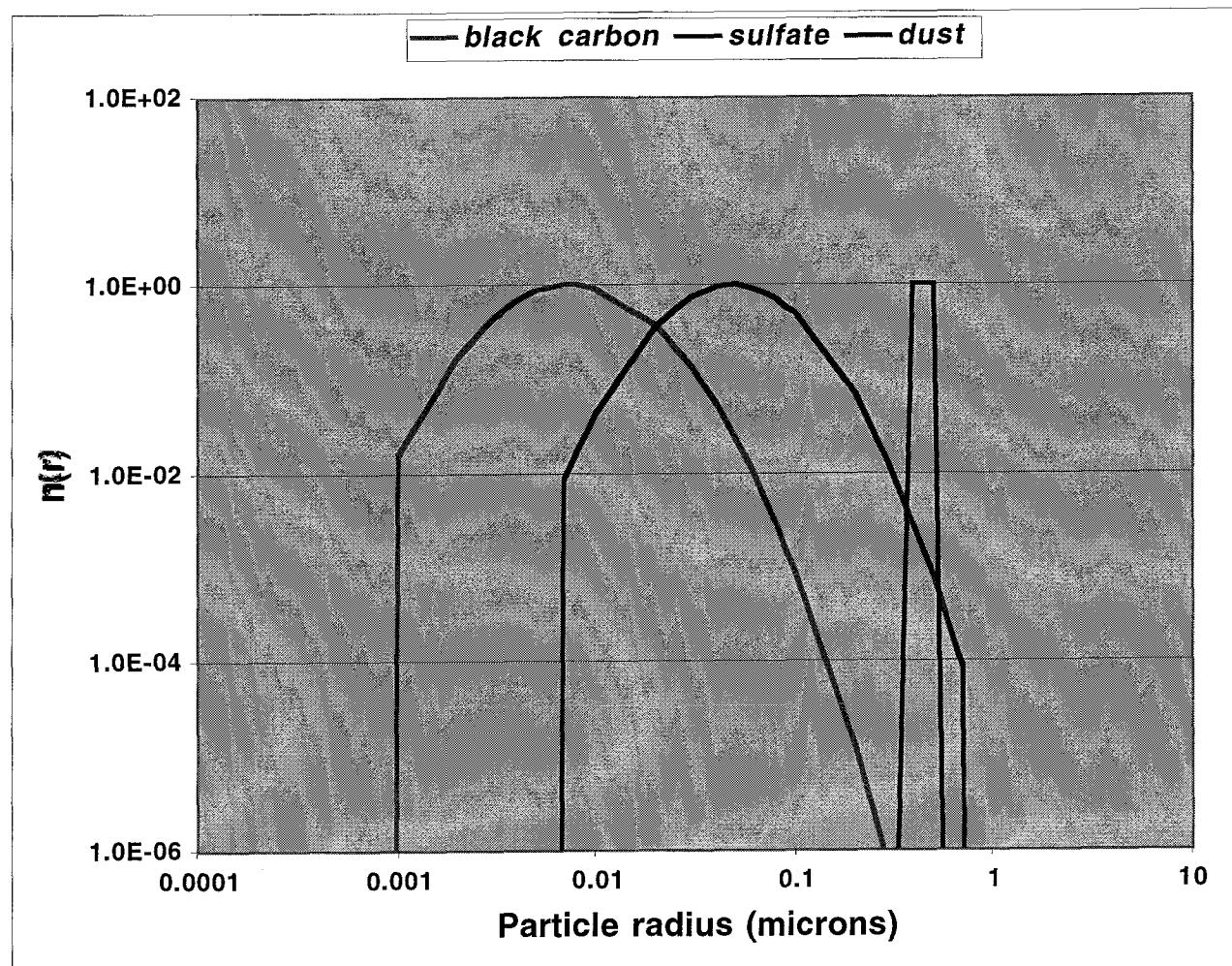
90% sulfate 10% black carbon	0.92
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85% sulfate 15% black carbon	0.88
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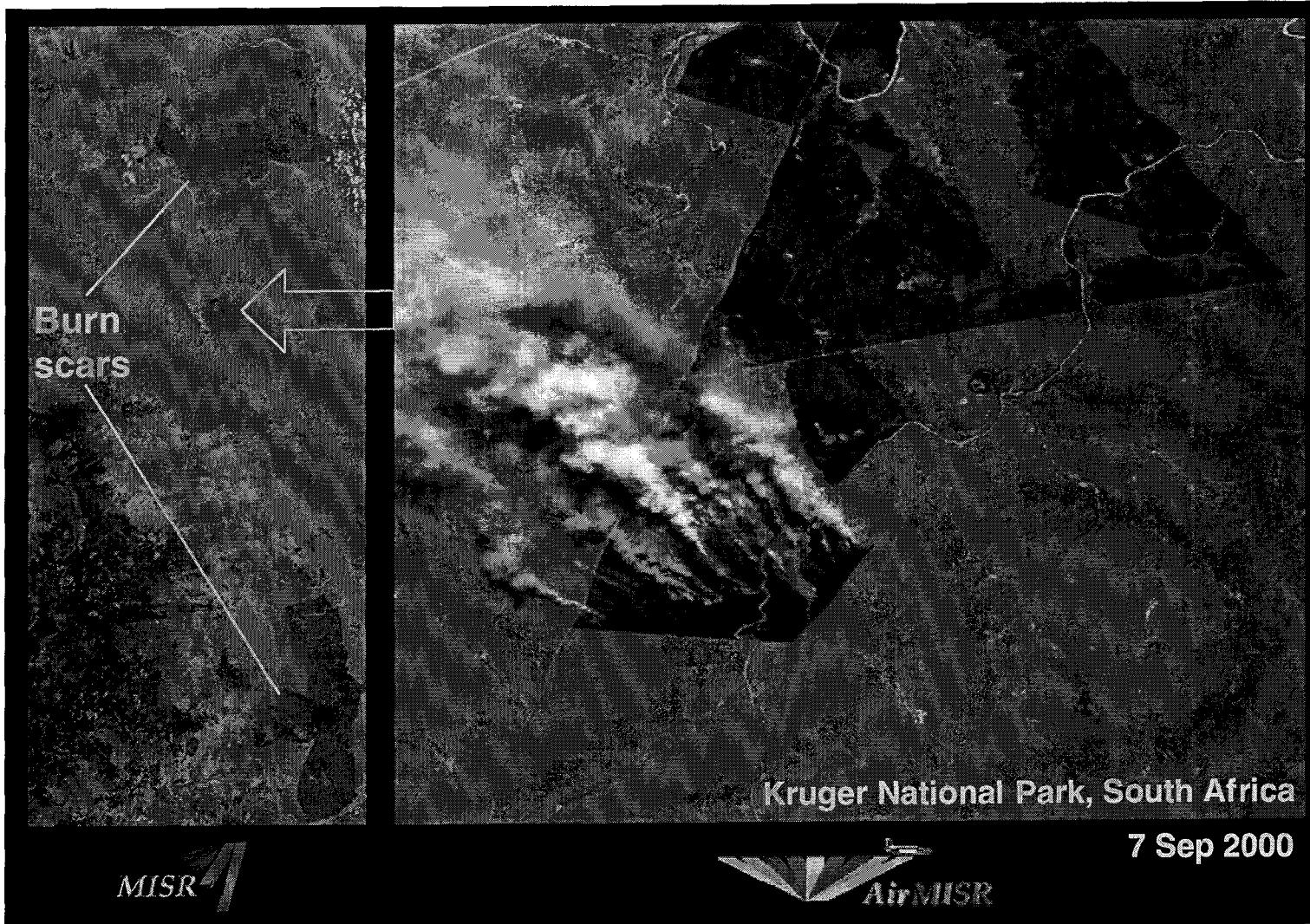
80% sulfate 20% black carbon	0.84
---------------------------------	------

75% sulfate 25% dust	0.98
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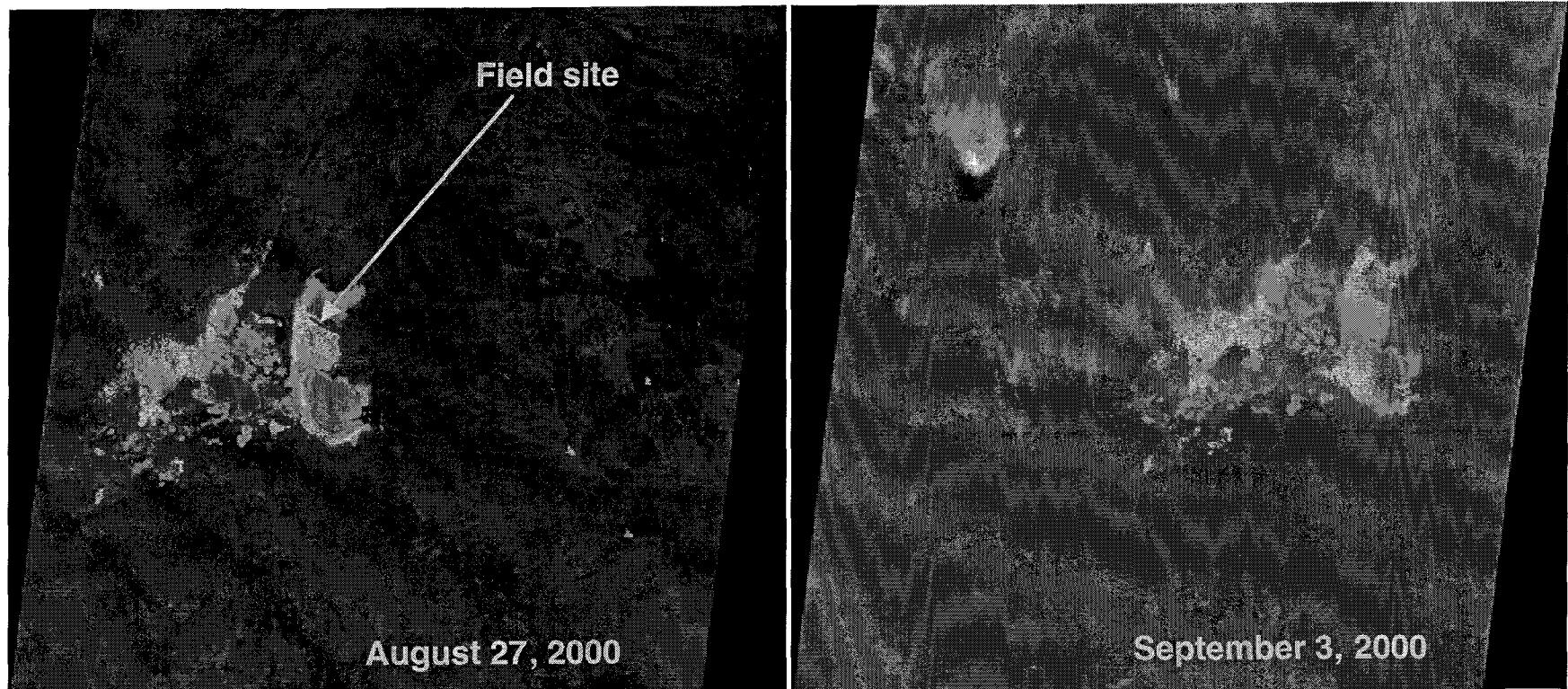
NORMALIZED SIZE DISTRIBUTIONS OF COMPONENT PARTICLES



GRASSLAND FIRES ARE A MAJOR SOURCE OF AEROSOLS



VICINITY OF SUA PAN, BOTSWANA



46°-aft MISR top-of-atmosphere images

Retrieved 558-nm optical depths

MISR: 0.117 ± 0.027

Reagan: 0.083

CIMEL: 0.086

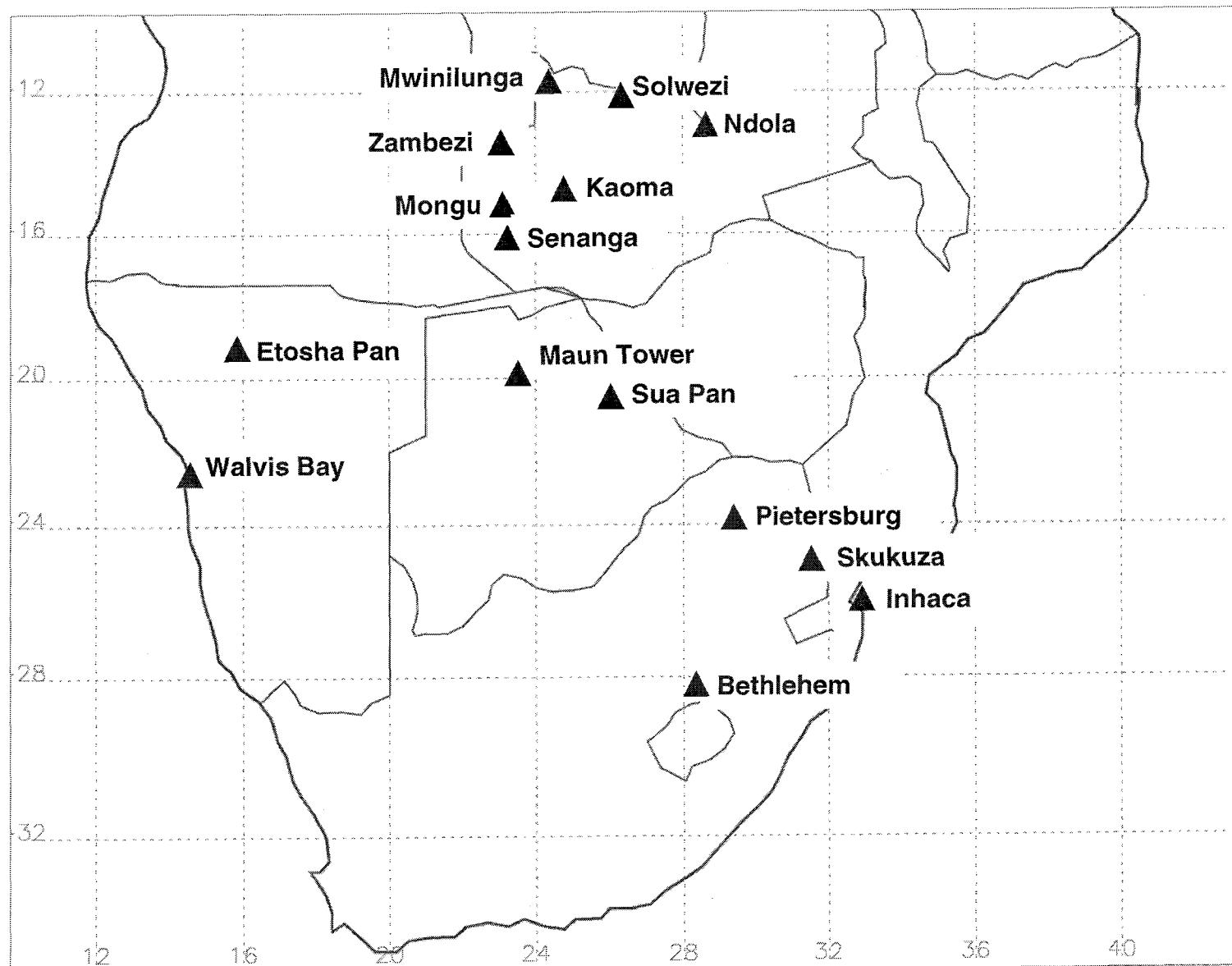
Retrieved 558-nm optical depths

MISR: 0.886 ± 0.095

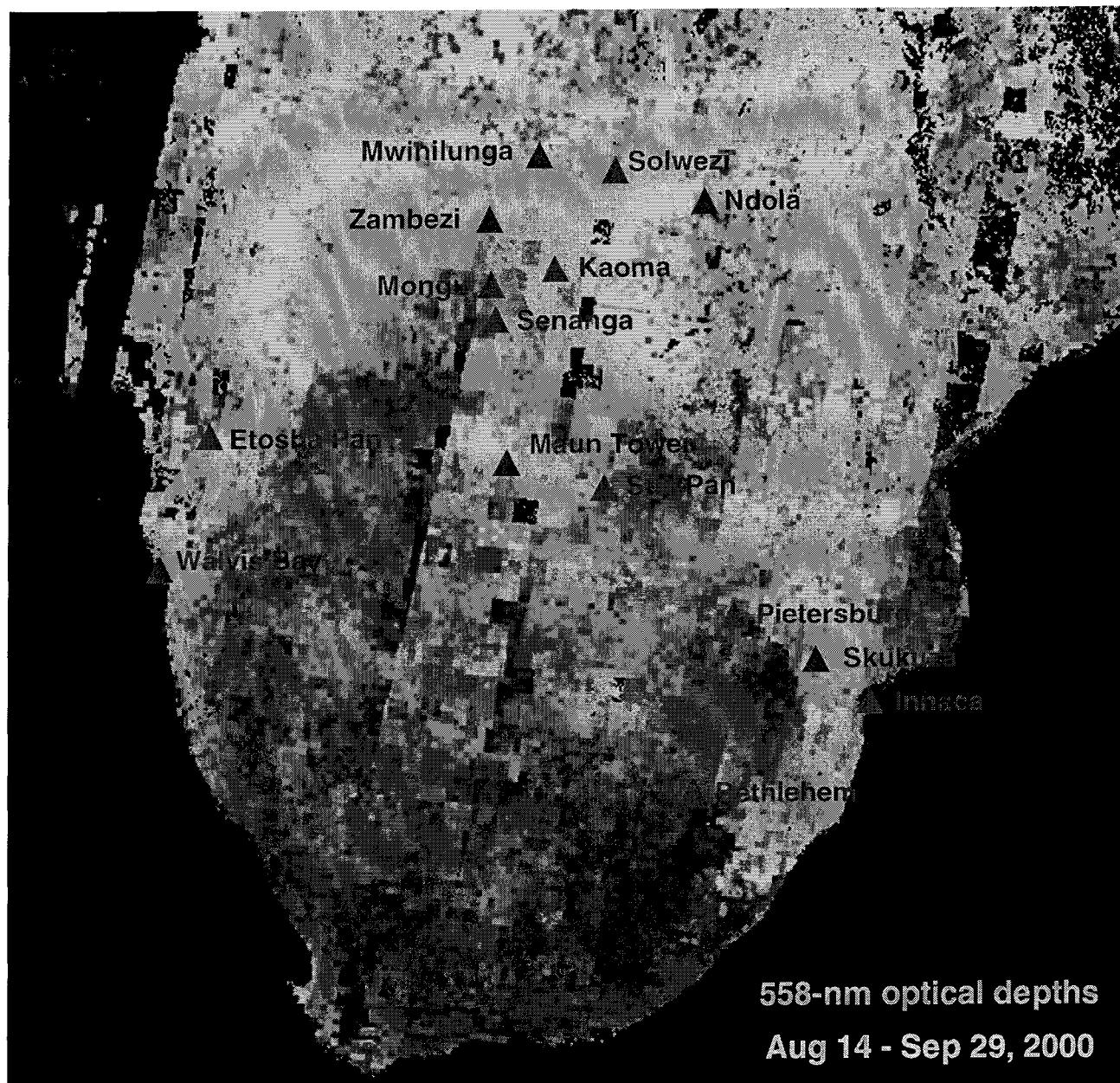
Reagan: 0.724

CIMEL: 0.777

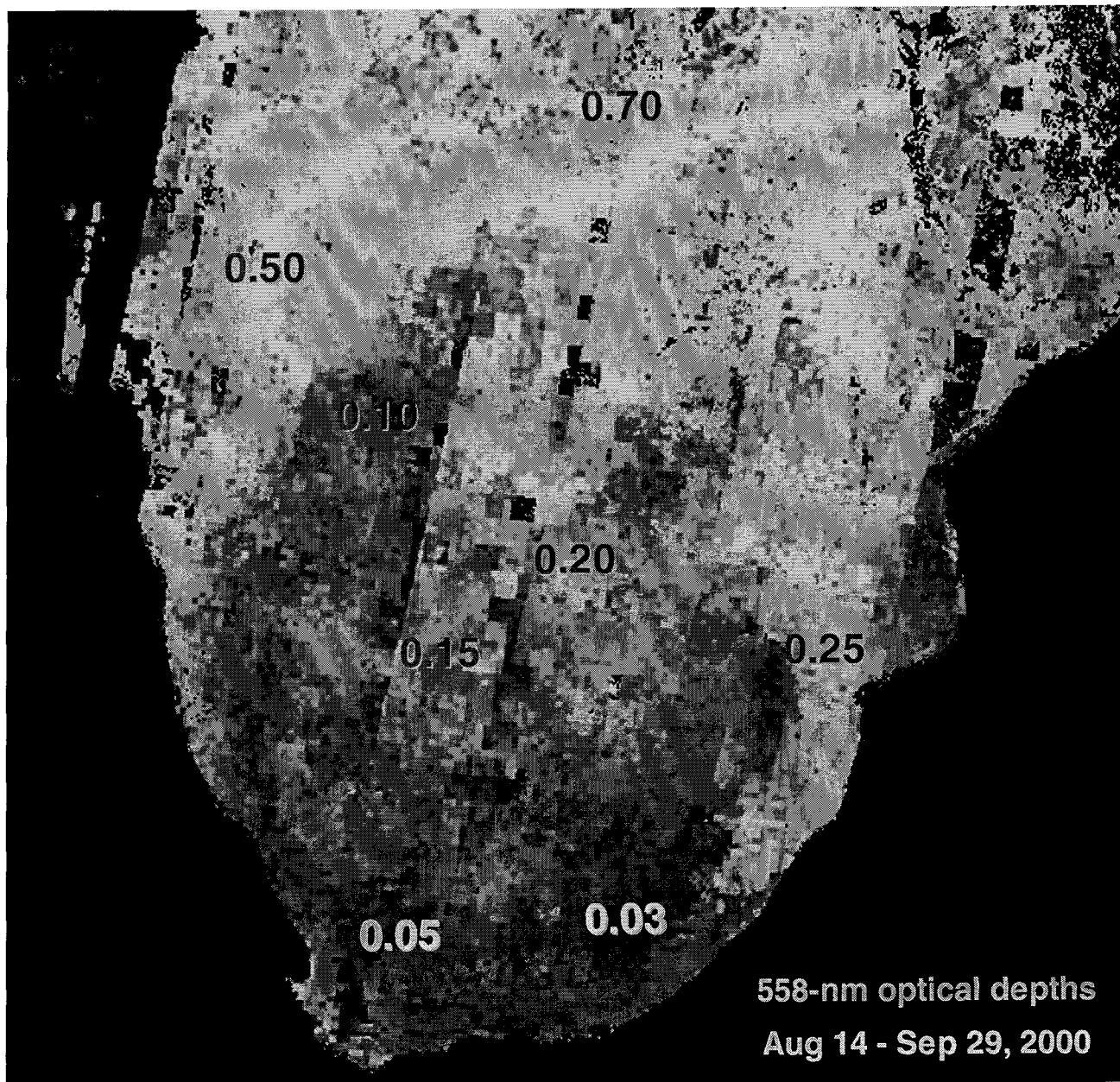
SAFARI-2000 AERONET SITES



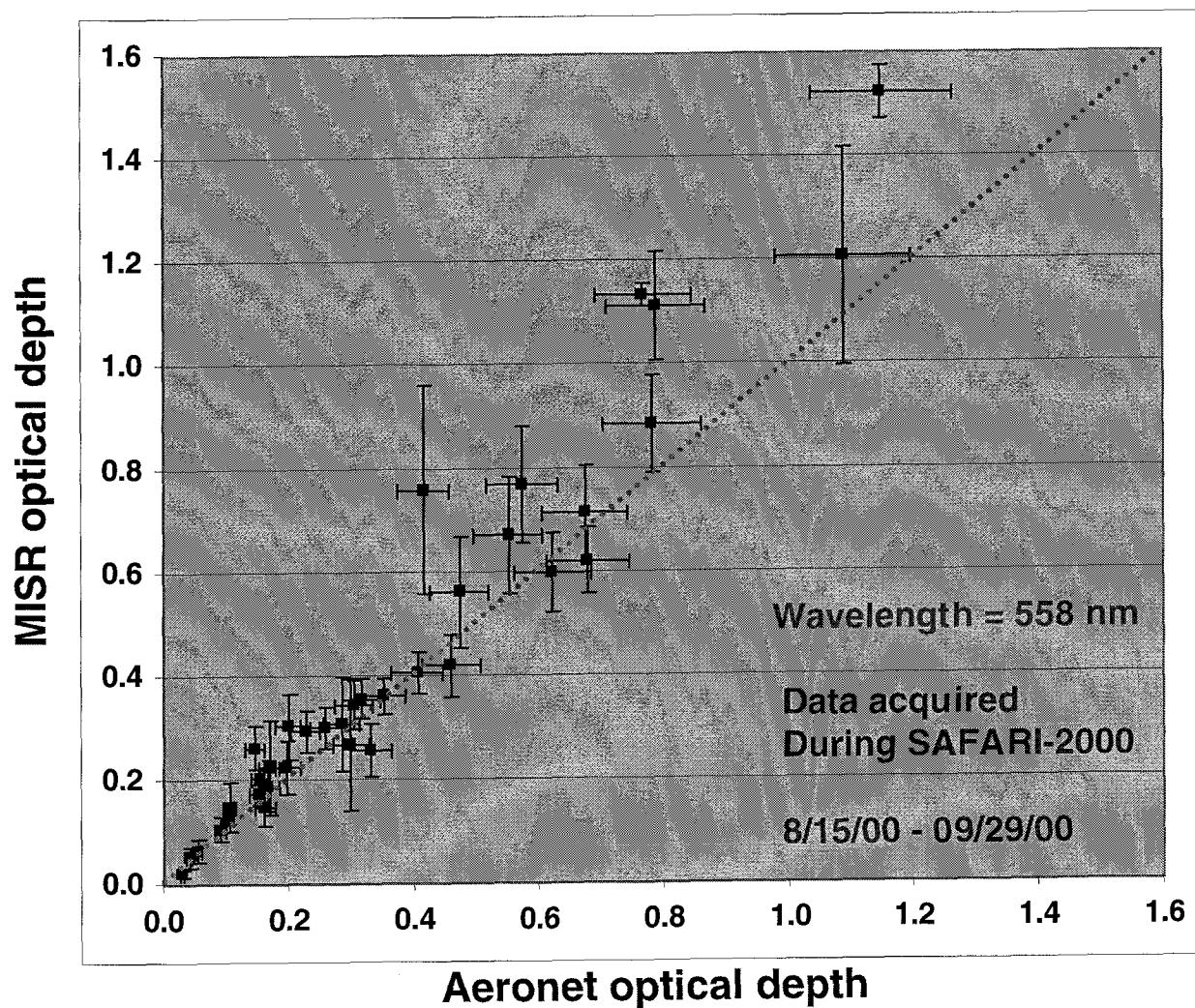
MISR AEROSOL OPTICAL DEPTH MAP



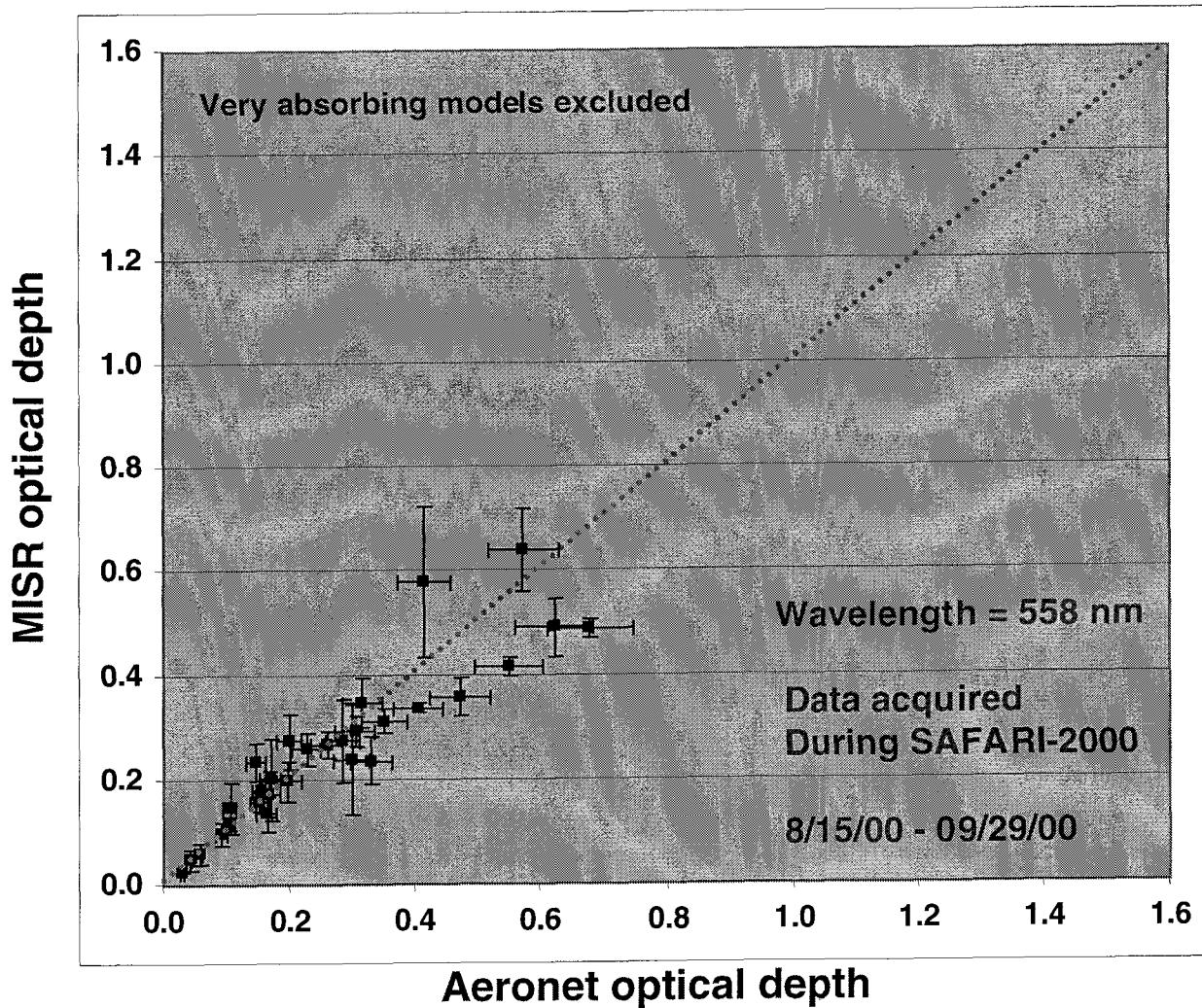
**MISR
AEROSOL
OPTICAL
DEPTH
MAP**



COMPARISON OF MISR AND AERONET OPTICAL DEPTHS



COMPARISON OF MISR AND AERONET OPTICAL DEPTHS



CONCLUSIONS



SAFARI-2000 has provided a first large-scale test of MISR's first-generation aerosol retrievals over land

The algorithm is providing optical depths in good agreement with Aeronet data in Southern Africa

Retrievals in regions of high optical depth appear to require the models containing small, absorbing particles. Whether the size or the absorption causes the better fits, or both, needs further study

**Beta versions of MISR Level 2 science products will be publicly available at the Langley Atmospheric Sciences Data Center DAAC in January
<http://eosweb.larc.nasa.gov>**

For more information: <http://www-misr.jpl.nasa.gov>